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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|-------------------|
| 10/605,678 | 10/17/2003 | Jin-Tau Huang | NTCP0016USA | 2677 |
| 27765 | 7590 | 03/21/2005 | EXAMINER | |
| NORTH AMERICA INTERNATIONAL PATENT OFFICE (NAIPC) | | | | EVERHART, CARIDAD |
| P.O. BOX 506 | | | | ART UNIT |
| MERRIFIELD, VA 22116 | | | | PAPER NUMBER |
| | | | | 2829 |

DATE MAILED: 03/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/605,678 | HUANG ET AL.  | |
| | Examiner | Art Unit | |
| | Caridad M. Everhart | 2825 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-15 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-15 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ . |

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 2 and 3 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling, critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). It seems that the specification discloses only removal of the photoresist and the use of the cap as a hardmask, not the use of the photresist as a hardmask.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation "stopping etching on the polysilicon layer" seems to be contradicted by the recitation "etching... a portion of the polysilicon layer", because it seems that a portion cannot be etched if the etching is stopped on the polysilicon layer(in which case the polysilicon layer would be used as an etch stop layer).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3,6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liaw (US 6,448,140B1) in view of Gocho(US 6,258,654B1).

Liaw discloses depositing a silicon dioxide gate insulator, a polysilicon layer, a tungsten silicide layer, and a hardmask of silicon nitride (col. 3, lines 50-65). These layers are etched to form a gate (col. 4, lines 6-15). The tungsten silicide layer is laterally recessed (col. 4, lines 57-67). Passivation is filled into the recess (col. 5, lines 30-35) and Fig. 4 features 9c). Photoresist is used to pattern the cap layer and the entire stack (col. 4, lines 13-20). APM is used to form the recesses (col. 4, lines 64-67). Spacers are formed from silicon nitride by anisotropic etch (col. 5, lines 20-36).

Liaw does not carry out the etch in two steps.

Gocho (US 6,258,654B1) is relied upon for its teaching of carrying out a tungsten silicide polycide etch in two steps, such that the polysilicon acts as an etch stop (col. 5, lines 65-67 and col. 6, lines 1-11).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the two-step etch taught by Gocho in the process taught by Liaw because Liaw discloses that conventional etch procedures can be used, and the procedure used by Gocho would include the protection of the polysilicon layer while the tungsten nitride layer is being processed.

Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liaw as applied to claim 1 above, and further in view of Curello (US 6,503,844B2).

Liaw does not teach removing the photoresist in order to use the cap layer as a hardmask.

Curello discloses the step of removing the photoresist in order to use the cap layer as a hardmask (col. 4, lines 15-25 and Fig. 3A, feature 54 is the hardmask).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the steps taught by Curello with the process taught by Liaw because the cap layer in the process taught by Liaw could have been used as a hardmask without the photoresist layer remaining on the patterned cap layer, and the material of the cap is the same in the process taught by Liaw and in the steps taught by Curello.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Everhart
3-16-05

C. Everhart
U.S. Patent and Trademark Office
PTO-904a (07-06-2001)